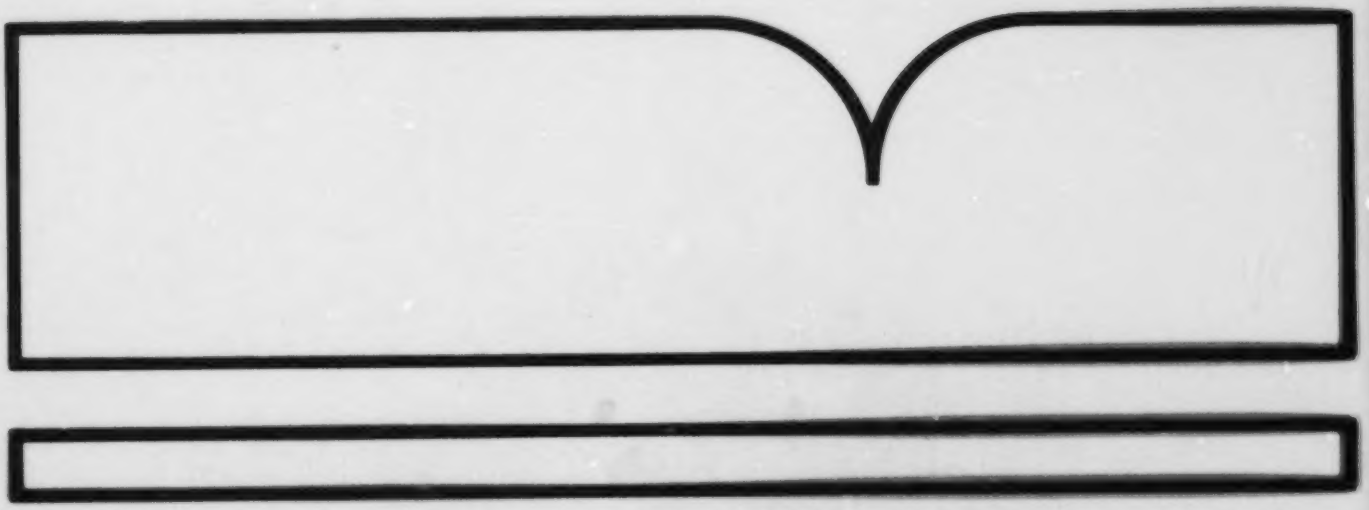
PB89-190169

Critique of Several Regulatory Analyses Regarding Solvent Wastes

Wisconsin Univ.-Madison

Prepared for:
Environmental Protection Agency, Washington, DC

Oct 88



U.S. Department of Commerce
National Technical Information Service

50272 - 101

REPORT DOCUMENTATION PAGE	1.REPORT NO. 600/9-89/026	2.	3. PB89-190169

4. Title and Subtitle
A Critique of Several Regulatory Analyses Regarding Solvent Wastes

5. Report Date
Completed Fall 1988

6.

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8. Performing Organization Rept. No.

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10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G) U-912766

12. Sponsoring Organization Name and Address
U. S. Environmental Protection Agency
Office of Cooperative Environmental Management
499 South Capitol Street, SW A101-F6
Washington, DC 20460

13. Type of Report & Period Covered
Technical Report

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

6106 A CRITIQUE OF SEVERAL REGULATORY ANALYSES REGARDING SOVENT WASTES

This report is part of the National Network for Environmental Management Studies under the auspices of the Office of Cooperative Environmental Management, U. S. Environmental Protection Agency. In 1981, President Reagan Issued executive order 12291. This order required that major new Federal regulations undergo an analysis to quantify both the benefits that the rule would provide for society, and the costs that would be incurred. Pursuant to this order, the Environmental Protection Agency has conducted a number of regulatory analyses to evaluate its regulations.

This paper is concerned with the accuracy and sophistication of the cost estimates used in several regulations that affect the disposition of solvent wastes. Its primary focus is on the analysis of the restrictions on land disposal of solvent wastes, but the Small Quantity Generator (SQG) and proposed Waste-as-fuel regulations are also examined.

17. Document Analysis a. Document Descriptors

b. Identifier's/Open-Ended Terms

c. COSATI Field/Group

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

18. Availability Statement	19. Security Class (This Report) Unclassified	21. No. of Pages 17
	20. Security Class (This Page) Unclassified	22. Price

(See ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

FINAL
6106-88

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A Critique of Several Regulatory Analyses Regarding Solvent Wastes

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October 1986

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INTRODUCTION

In 1981, President Reagan issued executive order 12291. This order required that major new Federal regulations undergo an analysis to quantify both the benefits that the rule would provide for society, and the costs that would be incurred. Pursuant to this order, the Environmental Protection Agency has conducted a number of regulatory analyses to evaluate its regulations.

This paper is concerned with the accuracy and sophistication of the cost estimates used in several of these analyses. In particular, it examines several regulations that affect the disposition of solvent wastes. Its primary focus is on the analysis of the restrictions on land disposal of solvent wastes, but the Small Quantity Generator (SQG) and proposed Waste-as-fuel regulations are also examined.

When discussing this topic, it is important to bear in mind that the decisions to create these rules are primarily made in the political arena. Benefits are usually not quantifiable in dollar terms and the precise magnitude of the costs and benefits identified usually have little to do with the actual decision to promulgate the rule. As long as the intended benefits occur without a prohibitively high cost being incurred, the rule will be issued. Several versions of the proposed rule may be analyzed, but usually only one of these versions assures that the intended benefits occur without imposing unreasonably high costs on the effected parties.

CRITCISMS

Reliance on Outdated Data

One obvious criticism of these analyses is their use of data that is outdated at the time the regulations take effect. For instance, the regulatory analysis of the land ban on solvent wastes was issued in 1986, but it made use of data on quantites and costs relevant for 1981 (Source 8). For the analysis of firm-level effects, data from the 1983 Annual Survey and 1982 Census of Manufacturers were used. The same time lag was observed for the SQG analysis: It was issued in late 1985 but its data were from a 1981 mail survey. The 1986 analysis for the proposed waste-as-fuel technical standards was only slightly better, using data that reflected conditions prevailing in 1983. [11; p 3-1].

Using this outdated data leads to significant errors because of the evolution and changes in hazardous waste treatment technologies, regulations, and prices. Handlers of waste are likely to have put much more effort into dealing with their hazardous waste since 1981. For example, manufacturers gross annual pollution abatement costs for all solid wastes increased about 50% from 1981 to 1985. [2; p 1]. Pollution control expenditures for solvents are likely to have increased even more than this due to its problematic and topical nature.

Using the 1981 data, the land ban analysis predicted that the ban's greatest impact would be on Chemical Manufacturers (SIC 28), with some firms experiencing costs equal to 43% of current costs and 1.2 times cash flow. [10; p 1-6]. Yet according to their trade association's surveys, chemical manufacturers have

reduced their generation of hazardous waste tremendously between 1981 and 1985. Members that responded consistently every year reported that from 1981 to 1985 their total amount of wastewater fell from 180 million tons to 140 million tons, and that their solid waste fell from 2.5 million tons to .9 million tons. [14; pp 9,11].

Evidence of waste minimization has also been noted in surveys of commercial treatment facilities [17; p 2-8], and the number of firms recycling hazardous waste (primarily solvents) also increased markedly after 1981. [8; p 72]. Given these changes in industrial practices since 1981, it is highly unlikely that the cost of the land ban is as high as predicted.

Criticizing the writers of these reports on this account is unfair. For the most part, they used the most recent data available. The problem lies in the fact that surveys containing data on the generation and treatment of solvent wastes are infrequent, not as thorough as they could be, and subject to long time lags when available. Recently the need for such surveys has been recognized and is being met, but unfortunately they are much too late for use in these analyses.

Assumptions about Responses

Not only did these analyses use figures that did not reflect the changes that have occured since their data were relevant, they also made very crude assumptions as to how the regulated parties would react after promulgation. Often only the most common practice was used to define both the baseline and compliance situations. Current practices were predicted not to change when in fact they could have become more expensive than

other available alternatives. [9; p 6-14].

For its cost calculations, the land ban analysis worked on the assumption that all affected organic and inorganic solvent sludges and half the organic liquids would be incinerated. The remaining organic liquids were predicted to be used as fuel substitutes and only a small amount distilled. By far the highest quantity of waste affected was solvent wastewater (2,480.7 million gallons). This entire quantity was assumed to be transferred from surface impoundments to storage tanks. [1; pp 3-4,5].

These simplifying assumptions seem silly in light of the tremendous diversification of methods actually used to treat solvent wastes: [15; p 32]

Treatment	# of facilities
Liquid Incineration	136
Solid Incineration	46
Wastewater	
Biological	84
Steam Stripping	14
Other	82
Solidification	66
Impoundment	42
Other Treatment	94
Solvent Recovery	407
Reuse as Fuel	178
Other Recycling	88

In addition to the above treatments, EPA has identified a number

of other demonstrated and acceptable treatments such as air stripping, fractionation, thin film evaporation, and wet air oxidation. [10; p 2-5].

Not only are the possible treatment technologies very diverse, so are the industries affected by the rule. The major industries that handle significant amounts of solvent wastes include Electronic Components, Electroplating and Metal Finishing, Paints and Allied Products, Manufacturing, Pharmaceuticals, and Chemical Manufacturing. [RCRA, Subtitle C]. This represents a significant part of American industry with a wide variety of corporate structure. Their reactions to regulation on solvent disposal will vary according to their size, necessity of solvents in the production process, and access to disposal alternatives at a reasonable price. Yet this analysis lumps these firms into a homogenous group and assumes they will respond identically. Only the differentiation between small and large quantity generators is apparent in the analysis.

-Wastewater Treatment

By far the most critical response assumption was that all the solvent wastewater currently in surface impoundments would be transferred to tanks. While much of this waste may have ended up in tanks, one would think that the specter of buying almost 2.5 billion gallons of tank capacity would cause at least some search for alternatives. Among the possible alternatives are dewatering to reduce volume, deep-well injection, placement in exempted impoundments, and some additional release under new or existing NPDES permits or to POTWs after some pretreatment. These alternatives are almost entirely ignored in the analysis. [10; p 2-10].

There is some evidence to support this assertion. Data from the Chemical Manufacturers Association (CMA) indicate that NPDES tonnage for all hazardous waste increased significantly the year that the land ban took effect. A smaller increase was observed for alternatives such as physical, chemical, and biological treatment. [14; pp 9,73]. Given that such a large percentage of their waste is solvent related, it is not unlikely that this increase was due at least in part to the ban on land disposal of solvents. The category that includes wastewater disposal increased for solvent recyclers also, possibly indicating an increase in NPDES permit and POTW utilization. [7].

-Incineration

Incineration of solvent wastes appears to have increased as predicted. The CMA's survey reported a 54.3% increase of incinerated hazardous waste in 1986. [14; pp 71,73]. As for commercial treatment firms, both their capacity and amount incinerated rose dramatically for 1985-1986 and 1986-1987. [17; p 3-12]. Although solvent waste did not make up all of this increase, it is likely to have been a contributing factor.

-Recycling

The predicted increase in solvent recycling also appears to have come about, and may have been larger than expected. Admitedly sketchy survey data from solvent recyclers seem to indicate a significant increase in their activities. Mean recycling capacity of those responding rose from 50,000 to 165,000 gallons per month between 1985 and 1987. (The median capacity showed a much smaller increase.) The mean monthly still bottom output over the same period rose 25%, although the median output level dropped substancially. These statistics should be taken with

more than a grain of salt. They are based on only 29 and 11 respondents for the 2 years surveyed. [7]. Thus the apparent increases may not hold for the entire industry.

-Fuel Substitution

Some intriguing statistics are observed when one looks at the way in which these recyclers have begun to dispose of their waste. Surprisingly, the percentage of their waste that they incinerated actually declined from 20% to 8% from 1985 to 1987. This is almost surely a result of the increase in the amount that they burned for fuel, which rose from 51% to 72% of the total disposed. [7].

This trend may be indicative of many generators of solvent wastes, which shows that the predicted increase in solvent wastes used as fuel was underestimated. As a recent survey of commercial handlers stated, "Often a solvent product is more expensive to recover than it is to produce. This makes it likely that the spent solvent may be burned for its BTU content as a waste fuel." [16; p 2-5]. This observation jibes with the increased burning of waste by solvent recyclers mentioned above.

According to the survey for the proposed waste-as-fuel rule, organic solvents made up 30% of hazardous waste burned for energy recovery in 1983. These wastes are burned in industrial boilers, cement kilns, and other industrial furnaces, none of which fall into RCRA's domain over incinerators. [11; p 3-9]. It is therefore quite likely that there has been an increase in solvent wastes burned as fuel in order to escape RCRA's restrictions on both incineration and land disposal. Commercial treatment facilities have noted that between 1986 and 1987 the amount of high BTU clean waste that they received declined, indicating that

generators were doing more onsite recovery and fuel substitution. [17; p 2-2]. Increased burning for energy recovery was also noted as a contributing factor in the alleviation of the expected shortfall of incineration capacity. [17; p 2-17].

Cost of Alternatives to Land Disposal not Constant

These changes due to a shifting regulatory landscape are examples of the regulated parties adjusting their behavior in order to minimze their costs. When their costs decline as these adjustments occur, then the regulation's cost to society also must be decreasing as time goes on. Yet in these analyses the cost to society is always expressed as a constant amount per year.

The costs also will be changing due to improving technology and competition. As the demand for solvent waste disposal services increases, old technologies will be improved and new ones will be developed. If they are more cost effective, they will be exploited and the cost of treating the waste will decline. The increase in demand will also cause expansion of old facilities and construction of new ones. Evidence of this can be seen in surveys of commercial treatment facilities, where it is evident that new incineration capacity dominated expansion plans in 1985, and by 1987 16 new fixed incinerators had been built. [16; p 3-16, 17; p iv]. As this expansion continues, competitive forces and improved information about the industry will take hold and drive the price of disposal down. As more facilities spring up, transportation costs to the nearest commercial facility will also decline.

Detectable Price Errors

In some cases it is actually possible to identify specific errors in the prices used to calculate costs. The land ban analysis used a price for offsite incineration of all types of solvents of $6.00 per gallon. [10; p 4-9]. Even after accounting for transportation costs, this is much higher than the $1.42 - $2.59 and $1.33 - $3.38 per gallon ranges (for 1986 and 1987 respectively) that actually prevailed. [17; p 3-18]. Prices used for solvent recovery were also above those that actually occured. The analysis used a range of $2.50 - $3.80 per gallon while during 1986 the actual prices charged were around $.40 - $1.00. [17; p 3-19].

Ignored Cost/Benefit Theory

There are a couple of aspects of cost/benefit analysis that these analyses overlook. First of all, the purpose of cost/benefit analysis is to compare 2 states of the world; one with the proposed project and one without. This adds an interesting complexity to the analysis that is for the most part overlooked: In the absence of Federal rules governing the disposal of solvent wastes, states and localities may have stepped in and issued their own rules. Indeed, these types of rules may have already been in effect. An example of this is California's efforts to control the use and disposal of hazardous wastes in advance of EPA's effort to do the same. If similar actions would have been taken in the absence of Federal rules regarding the land disposal of solvent wastes, then the incremental costs of that rule were overstated.

Another significant consideration untreated in these

analyses is that the whole amount of the costs involved in treating solvent wastes may not be a social cost. Specifically, a reduction in excessive profits that is caused by a new regulation is not a cost to society. It is merely a transfer from the owners of the company to the people and equipment that handle the waste. Whether this money goes to the firm's owners or to the disposers of the waste is irrelevant from society's standpoint: Either way it is lost to the rest of society. While these analyses do mention the predicted effects on firms' profits [10; exhibit 4-16] they do not consider that this reduction may not be a social cost.

This of course is only a valid consideration to the extent that economic profit is reduced. If the firms are able to maintain their level of profit by passing the increased disposal costs on to consumers, then the incremental cost of disposal is appropriately defined as a social cost.

Interaction with other Rules

One area in which these analyses excell is in examining the interaction among the regulations. The land ban analysis stresses the point that 14,400 generators of spent solvents will be brought into RCRA's domain from a combination of the new SQG definition and the solvent land ban. [10; p 1-5]. Likewise, the SQG analysis takes note of the then upcoming land restriction, stating, "This (the land ban) will limit the options available to 100 to 1,000 kg/month generators for managing their wastes -- in many cases removing the least-cost management option." [9; p 5-30]. Even the analysis of the proposed waste-as fuel technical standards considers its effect on newly designated

SQGs. [11; p 3-12].

CONCLUSIONS AND RECOMENDATIONS

Summary

The major criticisms in this paper can be summarized with four points:

1. The analyses' use of outdated data leads to incorrect modelling of the affected parties.
2. Simplifying assumptions predict a uniform response where a diverse response is likely.
3. The dynamic nature of changing market conditions is ignored.
4. Cost/benefit theory on the treatment of economic profits and counterfactual baselines is ignored.

To be fair, some of the above criticisms are noted within the analyses themselves. As mentioned above these analyses had no choice but to use outdated data because it was often the best available. These analyses also faced time and budget constraints which would have made more complex analyses difficult.

Recomendations

The most serious of the above problems is the lack of adequate data. This can only be rectified by increasing efforts at collection and processing of current surveys. This of course must be tempered by the need to not lay an excessive burden on those being interviewed. But the process cannot stop there. The data collected must then be made easily accessible as soon as possible to the policy analysts who need it, while still maintaining a sufficient level of confidentiality.

The next criticism could be remedied by identifying a number of "response classifications". Responses to the rule would then be predicted to be similar within the classification, but would also allow for different responses for each classification. The number of classifications considered could then be determined by the detail of available data and the desired accuracy of the prediction.

The last criticisms could be remedied with the analysis of multiple baselines in the absence of the rule and multiple response scenarios describing reactions that may take place after the rule takes effect. Current analyses tend only to identify an "upper bound" on the cost estimates, which may be likened to a worst case scenario. Multiple baselines and responses will provide policy makers with a more realistic idea of what the actual effects of the rule will be.

All of these remedies will cost money. Increased quality of data will require larger staffs to gather and process the raw data. Increased sophistication of the analyses will require increased manpower, especially if they are to be finished quickly. Therefore these improvements should only be added if their costs are outweighed by the benefits provided by more accurate analyses.

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